No. 740,151. PATENTED SEPT. 29, 1903.

F. J. LONGDON.

APPARATUS FOR ELEVATING LIQUIDS.

APPLICATION FILED DEC. 13, 1902.

NO MODEL.

Fig. 1.

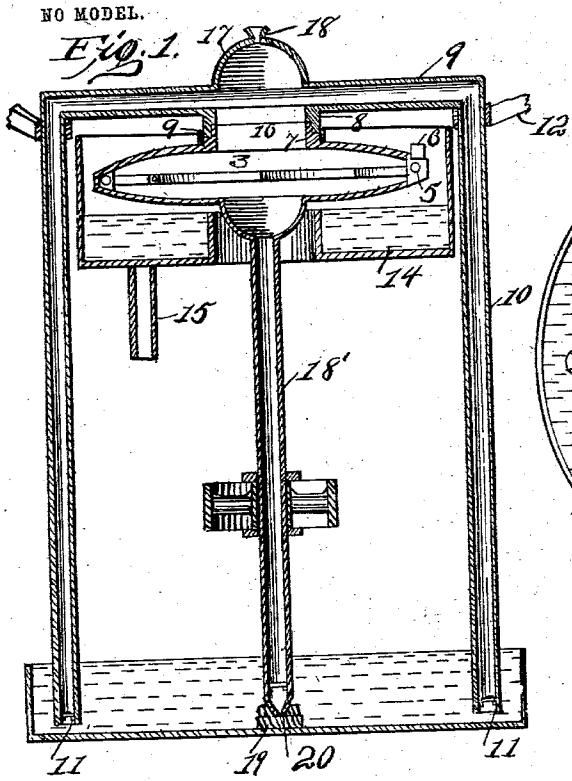


Fig. 2.

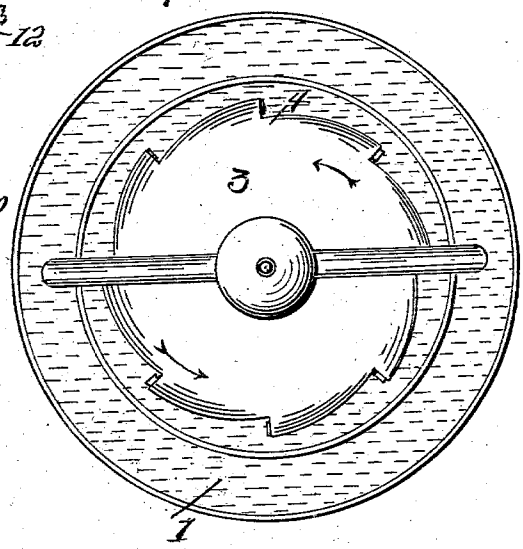


Fig. 3.

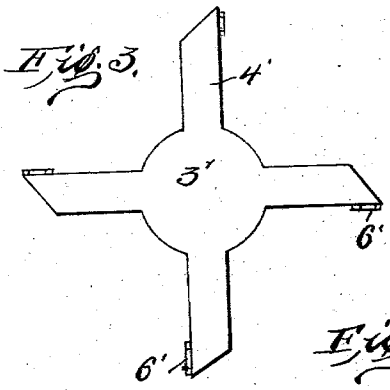


Fig. 4.

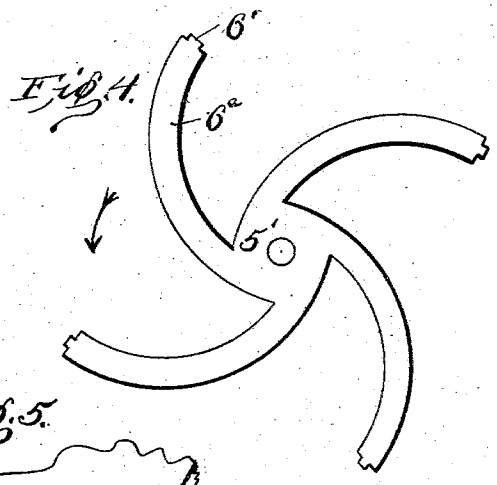
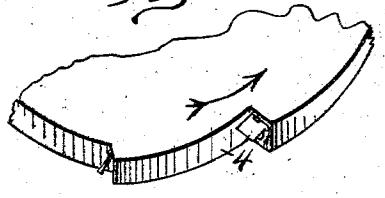


Fig. 5.



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No. 740,151. Patented September 29, 1903.

UNITED STATES PATENT OFFICE.

FRANCIS J. LONGDON, OF LINCOLN PLACE, PENNSYLVANIA.

APPARATUS FOR ELEVATING LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 740,151, dated September 29, 1903.

Application filed December 13, 1902. Serial No. 135,056. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS J. LONGDON, a citizen of the United States of America, residing at Lincoln Place, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Elevating Liquids, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in apparatus for elevating liquids, and while primarily designed and adapted for the pumping or elevating of water yet may be employed in other connections where a pump is employed for raising or elevating liquids to a desired height or position.

The invention aims to accomplish the lifting of liquids—such, for instance, as water—without the aid of a pump-cylinder and a suction-valve working therein to elevate the liquid, and aims to accomplish the elevating of the liquid through the medium of centrifugal force, discharging the water or other liquid at a point or elevation where the same may be conducted to any desired point or be stored in a suitable receptacle, as may be desired.

Briefly described, the invention comprises a suitably-supported rotatable hollow disk member or wheel the rotating joint of which is made air-tight, but of such construction as to reduce the friction of the joint to a minimum. One or more conducting-pipes lead from the body of water or other liquid to be elevated to this rotatable disk member or wheel, and the latter is supported or suspended above a catch-basin or other vessel to receive the water or other liquid discharged from the disk member or wheel. This disk member or wheel is exposed to the atmospheric pressure and is partially balanced by the minus pressure due to the water coming in at the upper side thereof and may be so adjusted that when filled with water the weight of the water therein will balance the atmospheric pressure against the disk member or wheel, whereby the weight of the latter is relieved from its support in order that it may rotate freely with the smallest possible amount of friction or resistance. The disk member or wheel is provided with a plurality of flap-valves, which are held normally closed and which are opened by the centrifugal force of the wheel or disk member to discharge the liquid into the catch-basin.

Other features of the invention will be hereinafter more specifically pointed out and then more particularly described in the claims, and in describing the invention in detail reference will be had to the accompanying drawings, forming a part of this specification, and wherein like numerals of reference will be employed for designating like parts throughout the different views of the drawings, in which—

Figure 1 is a central vertical sectional view of the apparatus, showing the same positioned in a receptacle filled with liquid to better illustrate the operation of the device. Fig. 2 is a detail top plan view. Fig. 3 is a detail plan view of a modified form of disk member or wheel. Fig. 4 is a like view of another modified form of disk member or wheel, and Fig. 5 is a detail perspective view of a part of the preferred construction of disk member or wheel.

For the purpose of illustration I have shown the device mounted in a suitable receptacle 1, which is adapted to be filled with water or other liquid. In practice the device may be employed in various connections—such, for instance, as in a cistern or the like—and hence the illustration I have shown will answer for the purpose of illustrating the operation, and I will specifically refer to the device in connection with this receptacle shown for that purpose only and not as limiting its use in any particular.

The apparatus embodies a disk member or wheel which is hollow, so as to receive water or other liquid. This disk member or wheel may be of the form shown in Figs. 1, 2, and 5, in which the member is substantially circular in form and is provided around its periphery at equidistant points with spout-like projections 4. The disk member or wheel 3 tapers or converges toward its periphery, so that at the periphery or circumference the distance between the upper and lower faces thereof is considerably decreased. The spout-like projections 4 are practically wedge shape in configuration, the outer face of the one projec-

tion curving gradually until it meets the square shoulder or rear end of the next projection, and each of the projections is provided in its square end with a port or opening 5, through which the water is discharged, as will be more fully explained hereinafter. These ports or openings are normally closed by flap-valves 6. The upper face or plate of the disk member or wheel carries a centrally-arranged neck or collar 7, exteriorly shouldered off at its upper end to form a neat fit with an interiorly-shouldered collar 8. In practice I construct these collars so as to form an extremely neat fit, but still permit of free rotation of the disk member or wheel, and in order to exclude all air and make the joint perfectly air-tight, which it must be to insure the perfect working of the apparatus, I employ an exterior sheath or covering 9, preferably composed of chamois-skin, which has been found the most desirable in practice, though other suitable material may be employed. Communicating with the collar 8, and therefore with the disk member or wheel, are branch pipes 9, connected to vertical pipes 10, which latter extend into the receptacle 1 and are preferably provided at their lower ends with flap-valves 11, positioned so as to admit liquid to the pipes 10, but prevent the passage out through the bottom of the pipes of such liquid as is admitted. In the present illustration of the invention I have shown two pipes 9 and two pipes 10; but I desire in this connection to call attention to the fact that the apparatus will work equally well with but the one pipe 10 leading into the liquid to be elevated, or more than two pipes leading to the liquid may be employed. Of course when used in practice means suitable to the requirements will be provided for supporting the apparatus perfectly rigid as to any lateral movement, and I have simply shown braces 12 connected to the pipes 10 in this illustration. Underneath the disk member or wheel is a suitable drip or catch basin 14, suitably supported and provided with an outlet 15 for conveying the water discharged therein to any suitable point. Centrally above the opening 16, leading to the disk member or shell, I preferably provide a crown or bell 17, provided with a port or inlet 18, which may be normally closed by any suitable stopper. Centrally connected to the lower plate of the disk member or wheel is a driving member and support, which may either be in the form of the tube 18′, as shown, or this member may be a solid rod. Its end is preferably pointed or made tripod-shaped, as seen at 19, and rests upon a suitable bearing 20, supported in the receptacle 1. It is to be noted that the central underneath portion 21 of the disk member or wheel is made convex, though this is not essential; but attention is directed to the fact that this central underneath portion of the disk member or wheel is exposed to the atmospheric pressure. To the member 18′ is affixed a belt-pulley to receive a belt, (not shown,) driven in any suitable manner.

In Fig. 3 I have shown the disk member or wheel substantially in the form of a wheel, rather than in the form of a disk, as seen in Figs. 1 and 2. The body portion 3′ in this construction has radiating hollow spokes 4′, which are tapered on their ends and have the discharge-orifice in the long side thereof adjacent to the end, these orifices being normally closed by the flap-valves 6′. In Fig. 4 I have shown another modified form of wheel in which the body portion 5′ has curved radiating spokes 6^a, the orifices in the ends thereof being closed by the flap-valves 6′, as in the other construction.

In operation we will assume that the air has been pumped from the disk member or wheel and pipes 9 10, so as to form a vacuum therein. Water would immediately rise in the pipes 10 and flow into the disk member or wheel to fill this vacuum, and the disk member or wheel being rotated the centrifugal force of the disk member in rotating will open the valves and permit the water to be discharged into the catch-basin 14. The water or other liquid being discharged rearwardly of the spout-like projections, the impact thereof assists in the propulsion of the disk member or wheel, and it is to be noted that these spout-like projections, being somewhat wedge-shaped, protect the stream of water being discharged from the various orifices from the action of the air. Now likewise in operation, where it is impossible to create the vacuum, as described, I will fill the disk with water through the port 18, then stop up the port, and as the disk member is rotated and the water discharged by the centrifugal force a vacuum is created in the disk, which is instantly filled by the water drawn up through the pipe or pipes 10, which operation will be continued until the rotation of the disk member is ceased or the liquid in the receptacle is exhausted. The atmospheric pressure upon the under side of the disk member or wheel, due to the minus pressure incident to the ingress of water, serves to practically support this disk member, relieving, practically, all bearing from the support 18′, consequently reducing the friction to a minimum and permitting the rotation of the disk member or wheel with the utmost freedom.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with the wheel having discharge-openings, and an inlet-opening, of a collar encircling said inlet-opening, a pipe detachably secured to said collar, a bell secured to said pipe at a point directly above the said inlet-opening, and communicating with the interior of said wheel and a catch-basin arranged below the said wheel.

2. The combination with the wheel having discharge-openings and an inlet-opening, of

a collar encircling said inlet-opening, a pair of pipes formed with a collar secured to the first-named collar, valves in the outer ends of said pipes, a bell formed integral with said pipes at a point directly above the inlet-opening of said wheel, a catch-basin arranged below the said inlet-opening, the said catch-basin provided with an opening and a support for the said wheel arranged in the said opening.

3. The combination with a wheel having discharge-openings and an inlet-opening, of a collar encircling said inlet-opening, a pair of oppositely-extending pipes formed with a collar secured to the first-named collar, a covering surrounding the said collars making a tight joint, valves arranged in the outer ends of the said pipes, and a bell formed integral with the said pipes at a point directly above the inlet of the said wheel, substantially as described.

4. The combination with a wheel having discharge-openings and an inlet-opening, the said discharge-openings being closed by flap-valves, of a collar encircling the said inlet-opening and made integral with the said wheel, of a pair of oppositely-extending pipes formed with a collar secured to the first-named collar, a covering surrounding the said collars, valves arranged in the outer ends of the said pipes, a bell formed integral with the said pipes at a point directly above the inlet-opening of the said wheel, and a catch-basin arranged below the said wheel, substantially as described.

5. The combination with a wheel having discharge-openings and an inlet-opening, the said wheel provided with an upwardly-projecting collar, a pair of pipes, a collar formed integral with the said pipes and adapted to rest upon the first-named collar, the said pipes having downwardly-extending portions, and a catch-basin arranged below said wheel having a central opening, of a tank located below said catch-basin, and a support for the said wheel arranged in the said opening in the catch-basin and resting upon the bottom of the said tank, the said downwardly-projecting portion of the said pipes extending into the said tank, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

FRANCIS J. LONGDON.

Witnesses:
H. C. WOOZLEY,
A. M. WILSON.